AN EDIBLE METHOD OF EVALUATION

Elaine R. Dria and James T. Martino
Wilson Junior High School
Hamilton, OH 45013

As the school year stretches into June, both the students and the teacher wish to be outside or at least doing something different. Faced with a general mathematics class containing 28 students who score below the 25th percentile on the Iowa Test of Basic Skills mathematics composite, a real effort must be made to keep these students functioning. These students have a "test phobia" and an effort must be made to make testing a low stress endeavor.

The last quarter of the year covers consumer mathematics, loan application forms, and probability. The latter includes simple probability (coin flipping, for example), expressing probability as odds, and mathematical expectation. Keeping in mind the contents of this last quarter and the need for retention of previous material, the challenge then becomes to create a non-threatening method of evaluation for these students.

In keeping with the NCTM standards, using manipulatives provides a learning experience with less of a threat to the individual than straight multiple choice or customary paper tests of problem solving. A familiar manipulative makes the testing even less stressful than usual and also makes the class more interesting. Manipulatives that can be eaten after the test is finished encourage the students to get on with things and not waste time. With these thoughts in mind, the lead author developed the following test for use in her general mathematics class as a final examination for the second semester. Each student contributed $.50 to the teacher who then purchased packages of M&Ms for each student. These packages were given to each student at the beginning of the exam period.

Math I Exam

All work must be shown on this paper

1. Count the number of candies and report to the teacher.

   _____candies.

2. Sort by color and record the number of each color.

   _____red

_____orange
_____brown
_____tan
_____green
_____yellow

3. Create a bar graph in the space to show how many M&Ms of each color were in your sample. (5 pts)

4. Using class data from the board, find the: (4 pts)
   a. mean
   b. median
   c. mode
   d. range

5. What are the following probabilities assuming you replace before drawing again? (5 pts.)
   a. p (orange)
   b. p (green)
   c. p (purple)
   d. p (orange, red)
   e. p (brown, tan)

6. What are the following ratios (in lowest terms)? (4 pts.)
   a. red:total
   b. green:orange
   c. brown:tan
   d. yellow:orange

The letter grade scores on this test were, on average, one letter grade higher

than the multiple choice examination given at the end of the first semester. The students thought this a less demanding, more relaxed exam than the other exams they took as part of their final exam series. They were deceived. The examination still addressed five of the twelve performance objectives covered during the year. The objectives were chosen from all four quarters. Only one day was allowed for review for this test as the students were still learning new material until the final examination period.

The five objectives covered and the questions related to them were:

(1) Without the aid of electronic equipment, the student will perform the four basic operations using whole numbers with 75% accuracy. (Q2&4)

(2) Without the aid of electronic equipment, the student will perform the four basic operations using fractions with 75% accuracy. (Q5&6)

(3) Given a set of data, the student will organize, interpret, and analyze the data with 75% accuracy utilizing graphing as well as other forms of organization. (Q3&4)

(4) Given the direction, the student will solve and correctly use ratios, proportion, and rate problems with 75% accuracy. (Q6)

(5) Given the direction, the student will use elementary notions of probability with 75% accuracy. (Q5)

Questions 5 and 6 require the teacher to do calculations for each individual student. This takes more time in grading than is required by using a multiple choice format or by using one package of M&Ms and doing the counting for the class. But the additional time required is a small price to pay for the additional information provided about each student. It is obvious from students' answers if they understand the statistical terms. If the answer is incorrect for each of the terms, it is easy to note whether the answer is caused by confusion between terms, ignorance of the definition of the terms, or lack of concern on the part of the student. Since all calculations must be shown on the paper, the same also is true of questions 5 and 6. Questions 5d and 5e receive partial credit if the students indicate the multiplication but do not perform the multiplication. Partial credit is given also in question 6 if the numbers chosen are correct but are not reduced to lowest terms.

Question 1 is graded on the basis of the answers given in question 2. The total number of M&Ms in question 2 must equal the number given in question 1. Even if the answer to question 1 is incorrect, it is still used as the basis for grading questions 5 and 6. Students will probably refer to their answer to question 1 throughout the test and it is unfair to penalize them for this.

The students enjoyed this examination and appeared interested in doing the work asked of them. The authors feel that using a common manipulative helps relieve the stress many students feel during evaluations. Eating part of the evaluation also may relax the students. The students involved are not the "academic elite". Many of them are counting minutes until school ends. This evaluation instrument holds the students' interest and allows students to succeed. Nothing is more important than that in educating students.

AN ANNOUNCEMENT FROM:

RCDPM (Research Council for Diagnostic and Prescriptive Mathematics)

With the cooperation of Educational Testing Service (ETS), the New Jersey Department of Higher Education and Trenton State College, the Research Council for Diagnostic and Prescriptive Mathematics (RCDPM) will hold its Nineteenth Annual Conference in the Princeton, New Jersey area 14-16 February. Program Chair Richard Lesh (ETS) has announced two themes: Assessment at All Levels and Collegiate Mathematics Education. The conference will include about 50 research reports and thematic presentations as well as plenary addresses by Mathematics Educators Jan de Lange and Thomas Romberg and Science Educator William Aldridge. Presenters are being encouraged to provide time for interchange with participants. RCDPM represents a broad range of interests in Mathematics Education research, but has traditionally placed strong emphasis on individual and clinical work with students at all levels. For registration and additional information, contact David E. Boliver, General Conference Chair, Department of Mathematics and Statistics, Trenton State College, Trenton, New Jersey 08650-4700; (609)771-3042. The deadline for reduced rate conference motel rooms is Dec. 1.